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A BIBLIOGRAPHY OF THE TUNAS

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CUTTING UP THE TUNA

(From Gerhard, Eduard. Auserlesene Griechische Vasenbilder, Hauptsachlich Etruskischen Fundorts. Berlin, G. Reimer, 1858, vol. 4, plate 316, fig. 1. By permission of the publisher.)

The scene is from an ancient Greek wine pitcher now in the State Museum of Berlin. The black figures are painted on a red background, a characteristic of the vases dating from the sixth century B. C. The wreaths worn by the men are evidence that a feast is in preparation. Note the vessel placed to catch the scraps.

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INTRODUCTION

Because of the commercial importance of the tunas in southern California, scientific research has directed attention to questions of their life history and abundance. In this way a need was created for a full bibliography of the literature on the subject. The work of compilation was begun by Mr. W. F. Thompson in 1918, continued by Mrs. Ruth Miller Thompson, and completed by the present compiler after nearly two years of research in a number of libraries, that of the California State Fisheries Laboratory being the first. After consulting all available material there, the writer journeyed to the libraries of Stanford University, California Academy of Sciences, Division of Fish and Game of California in San Francisco, and University of California, both in Berkeley and in Los Angeles. In the winter of 1928–1929, the work was completed as far as facilities would permit, yet publication was postponed, because a trip to New York was being planned for the summer of 1929, and the added opportunities of consulting libraries there and in Washington were too valuable to miss. The library of the American Museum of Natural History yielded much valuable material which was augmented by consultation of the card continuation of Bashford Dean's "Bibliography of Fishes." Later, three very profitable weeks were spent in Washington, D. C., working in the following libraries: National Museum, United States Department of Agriculture, United States Bureau of Chemistry, Surgeon General's Library, Library of Congress, and the United States Bureau of Fisheries.

The goal striven for was to find all works written previous to the close of 1929, dealing in any way with the five large tunas: *Thunnus thynnus, Neothunnus macropterus, Germo alalunga, Euthynnus pelamis,* and *Sarda chiliensis.* As one would expect, other names and species have been included for reasons which are made clear by an examination of these papers. The rule followed in puzzling questions of synonymy in the index was this: when in doubt as to what fish was being considered, the exact name was used as given in the paper. The synonyms about which there was no doubt are all given a place in the index as "see also" references and all author citations are listed under the accepted name. However, it was thought best to retain the names and spelling used by each author in the résumé of each paper. The titles fall mainly into the following groups: systematic, morphologic, biologic, commercial, the latter concerned with local conditions of fisheries of the world, and with fishing methods and gear.

The writer consulted all papers listed with the exception of a very small number, and made a short résumé of the contents of each so that a really useful subject index could be compiled. Outside help was necessary in some instances when language difficulties were encountered, since nearly every important country has contributed something to the study of the tunas. A few papers could not be found in any of the dozen libraries consulted but were considered of sufficient importance to include because of title. Wherever possible some means was

employed for checking the accuracy of the citation, but where the individual paper was not consulted the fact is indicated by a dagger †. The important papers on a given subject are indicated by an asterisk * in the list of authors.

The author names are arranged alphabetically, and where there are several papers by one individual the arrangement is chronological. If an author published more than one paper in a given year, the fact is indicated thus: Roule, 1926.1, Roule, 1926.2, meaning the first and second papers published by Roule in 1926. For papers dealing only partially with tuna, paging is given for just that portion dealing with tuna.

Abbreviations for journals were chosen with full regard to clearness, but since confusion invariably arises in some cases, it seemed advisable to include a list of all journals cited, together with their place of publication. Geographic names have not been shortened, with but one exception: U. S. standing for United States. The list is alphabeted according to the abbreviations as an aid in finding the full names.

The hearty cooperation of all the librarians is most deeply appreciated. Especial thanks are due Dr. E. W. Gudger for his able assistance, not only in offering facilities at the American Museum of Natural History including the continuation of Dean's "Bibliography of Fishes," but in giving the writer letters of introduction to other libraries, thereby opening the way to the best service possible. Mr. J. T. Nichols, Curator of Recent Fishes at the American Museum of Natural History, very kindly rendered assistance in clearing up questions of synonomy. The various individuals who were called upon for help at the United States Bureau of Fisheries and the Library of Congress deserve the warmest praise for their skilled assistance. To Mr. William Radcliffe, of Upper Deal, Kent, England, author of "Fishing from the Earliest Times," appreciation is expressed for the gift of the electro-block from which the frontispiece was made. The members of the staff of the California State Fisheries Laboratory gave valuable assistance and encouragement as the work progressed, and for this service the writer wishes to convey grateful thanks.

One of the most interesting facts ascertained by the writer during this search for information about the tunas is that these fish have been important to the life of man from the earliest times. The frontispiece gives evidence that as early as the sixth century B. C., they were of enough significance to find a place in Greek art. The fact that they have kept their life habits so closely wrapped in mystery through the march of the centuries is an added incentive to research. Although freedom from error has been the shining goal constantly striven for, the writer is aware perfection has not been attained, yet this bibliography is submitted in the eager hope that it may prove in the nature of an organized list of clews that may help point the way to a solution of the mystery shrouding the life of the tunas.

December, 1929.

AUTHORS' LIST OF TITLES

NOTE.—The most important papers are marked thus: *. Those marked with a dagger † were not seen by the compiler but were included because they seemed important. Inconsistencies in the spelling of scientific names arise from the fact that the exact spelling was used as that found in the paper cited. The numbers in bold face type (such as: **6**) indicate volume number.

A

Adams, Walter Marsham.

1883. A popular history of fisheries and fishermen of all countries, from the earliest times. Intern. Fish Exhib. Lit., Handbook **1**, pt. 1, 6 art., p. 18, 19.
Mode of capture of tuna by ancient Greeks; derivation of name.

Aeschylus.

1922. Aeschylus, with an English translation by Herbert Weir Smyth. New York, 1922–1926, **1**, line 424ff.

Aflalo, F. G.

1904. British salt-water fishes with a chapter on the artificial culture of sea fish by R. B. Marston. London, p. 13, 271, 282–283.
Orcynus thynnus, *O. germo*, *Thynnus pelamys*, listed as rare fishes in English waters; range.

Agassiz, Louis.

1833. Recherches sur les poissons fossiles. Neuchatel, 1833–1843, **5**, p. 55–60. Atlas pls. 23, 24, 27.
Fossils of *Thynnus propterygius*, *T. bolcensis*, *Orcynus lanceolatus*, *O. latior*, from Monte Bolca, described.

Aldrovandi, Ulisse.

1613. De piscibus libri V, et de cetis liber unus. Bononiae, bk. III, ch. 18, p. 307–324.
Thynnus thunnus and *Orcynus rondel* figured; synonomy; description; distribution; natural history. Titles of chapters on tuna: age; methods of catch; uses as food; uses as medicine.

Allen, Edward Johnson.

1926+. Current bibliography. Journ. Conseil, 1926, **1**, no. 3, p. 300, no. 4, p. 382; 1927, **2**, no. 1, p. 106, no. 2, p. 266, no. 3, p. 395; 1928, **3**, no. 1, p. 130.

Allegemeine Fischerei-Zeitung.

1912. Der Thunfischfang im Atlantischen Ozean. Allg. FischZeitg., no. 3, p. 74.

Amico, F. C. de.

†1816. Osservazioni pratiche intorno la pesca, il corso, il cammino dei tonni. Messina.
Practical observations about the Italian fishery, the migrations, and the route of the tuna.

Angotzi, Francesco.

†1905. L'industria delle tonnare in Sardegna. Bologna.
Tuna industry in Sardinia.

Anuario Estadístico de la Marina Mercante y de la Pesca Marítima. 1914.

1915. Madrid.
Statistics.

Apicius.

1542. In hoc opere contenta Apicii Caelii de opsoniiset condimentis, sive arte coqvinaria libri X. Item. Gabrielis Humel bergii . . . annotationes. Tigvri, In officina Froschouiana.
Ancient recipes for preparation as food.

Argentier, ———.

1914. Étude d'ensemble sur les pêches de la sardine, du thon et des crustacés. VI Cong. Nat. Pêch. Marit. Tunis. Paris, **2**, p. 105–127.
Thynnus vulgaris; T. thunina; T. alalonga; fishery methods; boats; gear; value of fishery; canning; distribution of product.

Aristotle.
1897. History of animals. Ten books. Translated by Richard Cresswell. London. Bk. 5, ch. 25, p. 3; bk. 6, ch. 16, p. 5; bk. 8, ch. 15, p. 5; bk. 8, ch. 17, p. 2, 3; bk. 8, ch. 20, p. 8, 9; bk. 9, ch. 3, p. 1.
Parasites; reproduction; delights in warm weather; migrations governed by poor sight; goes into mud in winter; travels in schools.

Årsberetning Vedkommende Norges Fiskerier.
1928. Fremme av stør jefangsten. Årsber. Vedkom. Norges Fisk. [for 1927] no. 1, p. 89–90.
Fishery in foreign countries.

Artedi, Peter.
1738. Ichthyologia, sive opera omnia de piscibus scilicet. Pt. 1. Bibliotheca ichthyologica. Pt. 2. Philosophia ichthyologica. Pt. 3. Generum Piscium. Pt. 4. Synonymia specierum. Pt. 5. Descriptiones specierum. Lugduni Batavorum, Leyden.
Pt. 1, p. 49–50: *Thunnus*, different spellings, references in literature. Pt. 3, p. 210–211: *Thunnus*, description. Pt. 4, p. 49: *Thunnus thynnus, T. orcynus, T. belloni*, synonymy.

Atco Fisheries News.
1926. The tunas, albacores and bonitos. Acto Fish. News, **6**, no. 4, p. 6.
Short description and use of *Germo macropterus, G. alalunga*, and *Thunnus thynnus; Germo alalunga* figured.

Athanassopoulos, G.
1923. Sur les thonnidés en Grèce. C. R. Acad. Sci. Paris, **177**, p. 501–502. *Also in* Pêch. Marit., 1923, **6**, no. 283, p. 767–768.
Migrations.

1924. Note complémentaire sur les "Thonnidés" en Grèce (Méditerranée orientale). Bull. Inst. Océanogr. Monaco, no. 440, p. 1–3.
Migrations.

1926. Notes sur la faune marine de la Grèce. Bull. Inst. Océanogr. Monaco, no. 480, p. 2–3.
Migrations.

1927. La migration des thons. Pêch. Marit., **10**, no. 452, p. 51.

Aubertin, ———.
1909.1. La pêche du thon en Méditerranée. V Cong. Nat. Pêch. Marit. Sables-d'Olonne, **1**, p. 196–220.
Methods of fishing in Mediterranean; statistics of fish caught by each method.

1909.2. La pêche du thon. Bull. Trim. Pêch. Marit., **14**, p. 1129–1151.
Methods of fishing and gear in Mediterranean; statistics.

Ausland.
1861. Sudfranzösische Thunfischerei. Ausland, **34**, no. 52, p. 1248.
Condition of fishery of southern France for season.

Avolio, François de Paule.
†1805. Sur les lois de la Sicile relative à la pêche. Palermo, p. 75.
Laws governing tuna fishery.

B

Baird, Spencer Fullerton.
1873. List of fishes collected at Wood's Hole. Rept. U. S. Fish Comm. [for 1871–1872] p. 825.
Orcynus secundi-dorsalis, O. alliteratus, recorded.

Barnard, K. H.
1927. A monograph of the marine fishes of South Africa. Pt. II. (Teleostei-Discocephali to end. Appendix.) Ann. South African Mus., **21**, pt. 2, p. 798–799.
Thunnus thynnus, Germo alalonga; synonymy; description; habitat; range.

Barnhart, P. S.
†1927. Pelagic fish eggs off La Jolla, California. Bull. Scripps Instn. Tech. Ser., **1**, no. 8, p. 91.
Sarda chiliensis, spawning season.

Barnhill, O. H.
1928. How California is utilizing mechanical refrigeration. Fish. Gaz., New York, **45**, no. 11, p. 19–21.

Baschieri, Adolfo.
1907. Sulla intossicazioni prodotte dal tonno. Bull. Sci. Mediche, ser. 8, **7**, p. 161, 557–564.
Poisoning produced by tuna.

Baskett, James Newton.
1899. The story of the fishes. New York, p. 268.
Orcynus thynnus; description; figure.

Bassani, Francesco.
†1891. Contributo alla paleontologia della Sardegna. Ittioloti Miocenici. Atti Accad. Sci. Napoli, 2. ser. **4**, no. 3.
Thynnus sp. from Miocene of Sardinia.

Bassett-Smith, P. W.
1903. Snake-bites and poisonous fishes. Journ. Bombay Nat. Hist. Soc., 1903–1904, **15**, p. 126.

Bean, Tarleton Hoffman.
1903. Catalogue of the fishes of New York. Bull. New York Mus., no. 60; 56. Ann. Rept. New York Mus., **3**, p. 391–393, 742.
Thunnus thynnus; range; records; description; seasonal movements; synonymy; fishery; growth in first year; size; killer whale as enemy; angling.

1906. A catalogue of the fishes of Bermuda, with notes on a collection made in 1905 for the Field Museum. Publ. Field Mus., no. 108, zool. ser., **7**, no. 2, p. 46.
Thunnus thynnus recorded.

Belli, C. M.
†1920. Il tonno salato sotto il punto di vista dell'igiene. Ann. Med. Nav., Roma, **1**, p. 42–47.
Salt tuna as food.

Belloc, G.
1927.1. Rapport sur le fonctionnement du laboratoire de La Rochelle. Notes Off. Pêch. Marit., no. 52, p. 23.
Temperature of water governing migrations of *Thynnus alalonga;* expedition of Hébé extending researches.

*1927.2. Rapport sur la croisière du thonnier "Hébé." Notes Off. Pêch. Marit., no. 52, p. 37–48.
Report of expedition: temperature of water in relation to habitat, food and migrations of the germon or albacore.

1927.3. Le comportement du germon (*Thynnus alalonga* Gm.) dans les couches d'eau tièdes de faibles épaisseur. C. R. Acad. Sci. Paris, **184**, p. 950–951.
Effect of temperature on migrations of *Thynnus alalonga.*

1927.4. Remarques sur le germon (*Thynnus alalonga*). Proc.-Verb. Cons. Explor. Mer, **44**, pt. 2, p. 92–97.
Food and fishery of *Thynnus alalonga* in Madeira and Canaries.

Bellón Uriarte, Luis.
*1925. Cómo se descuartiza el atún. Bol. Pescas, **10**, no. 101, p. 1–5.
Methods of cutting tuna for canning.

*1926.1. Preparación de conservas de atún. La cocción de la carne. Bol. Pescas, **11**, no. 116, p. 97–101.
Methods of canning.

*1926.2. La industria del atún en España. Res. Camp. Acuerd. Intern., no. 3, 98 p.
Catch figures; factory layouts and equipment; list of packers; personnel of factories; detailed diagram of layout of factory; methods of canning and salting; by-products; distribution.

Belon, Pierre.
1553. De aquatilibus libri duo. Cum eiconibus ad vivam ipsorum effigiem, quoad eius fieri potuit, expressis. Parisiis, p. 106–107.
Thynnus, description.

Beneden, Pierre J. van.
1871. Les poissons des côtes de Belgique, leurs parasites et leurs commensaux. Mém. Acad. R. Belgique [for 1870] **38**, p. 57.
Parasites and commensals of *Thynnus vulgaris.*

Bennett, Frederick Debell.
1840. Narrative of a whaling voyage around the globe, from the year 1833 to 1836. London, **2**, p. 278–281.
Scomber germo; description; coloration; food; shoaling habits in Pacific Ocean.

Bigelow, Henry B.
1925. Fishes of the Gulf of Maine. Bull. U. S. Bur. Fish. [for 1924] **40**, pt. 1, p. 212–215.
Thynnus thynnus; description; color; size; range; food and habits; commercial importance.

Bleeker, P.
1844. Bijdragen tot de geneeskundige topographie van Batavia generisch overzicht der fauna. Nat. Geneesk. Arch. Neêrland's-Indië, **1**, p. 553.
Thynnus recorded.

1852. Bijdrage tot de kennis der makreelachtige visschen van den Soenda-Molukschen Archipel. Verh. Batavia Genoot. Kunst. Wetens., **24**, p. 36, 37, 89.
Thynnus thunnina, T. tonggol and *T. macropterus* recorded from Dutch East Indies.

1856. Beschrijvingen van nieuwe en weinig bekende vischsoorten van Amboina, versameld op eene reis door den Molukschen Archipel, gedaan in het gevolg van den Gouverneur-Generaal Duymaer van Twist in September en October 1855. Act. Soc. Sci. Indo-Neerlandicae, **1**, p. 41.
Thynnus pelamys recorded from Dutch East Indies.

1860.1. Achtste bijdrage tot de kennis der vischfauna van Sumatra. Visschen van Benkoelen, Priaman, Tandjong, Palembang, en Djambi. Act. Soc. Sci. Indo-Neerlandicae, **8**, p. 29.
Thynnus pelamys, T. thunnina recorded from Dutch East Indies.

1860.2. Dertiende bijdrage tot de kennis der vischfauna van Celebes. Visschen van Bonthain, Badjoa, Sindjai, Lagoesi en Pompenoea. Act. Soc. Sci. Indo-Neerlandicae, **8**, p. 38.
Thunnus thunnina recorded from Dutch East Indies.

1860.3. Over eenige vischsoorten van de Kaap de Goede Hoop. Nat. Tijdschr. Nederlandsch-Indië, **21**, p. 53.
Thynnus pelamys recorded from Cape of Good Hope.

1861.1. Mededeeling omtrent vischsoorten, nieuw voor de kennis der fauna van Singapoera. Versl. Akad. Amsterdam, **12**, p. 52.
Thynnus thunnina, T. tonggol, recorded from Singapore.

1861.2. Iets over de vischfauna van het eiland Pinang. Versl. Akad. Amsterdam, **12**, p. 74.
Thynnus affinis recorded from Dutch East Indies.

1862. Sixième mémoire sur la faune ichthyologique de l'île Batjan. Versl. Akad. Amsterdam, **14**, p. 109.
Thynnus thunnina, T. macropterus, Pelamys macropterus, Thynnus pelamys, Pelamys pelamys, recorded from Dutch East Indies.

1865. Sixième notice sur la faune ichthyologique de Siam. Nederlandsch Tijdschr. Dierk., **2**, p. 173.
Thynnus thunnina recorded.

1875. Recherches sur la faune de Madagascar et de ses dépendances d'après les découvertes de François P. L. Pollen et D. C. van Dam. 4e Partie. Poissons de Madagascar et de l'île de la Réunion. Leide, p. 100.
Thynnus thunnina, Pelamys thunninus, Thynnus thynnus, recorded.

1879. Enumération des espèces de poissons actuellement connues du Japon et description de trois espèces in édites. Versl. Akad. Amsterdam, **18**, p. 15.
Thynnus sibi Schl. and *Pelamys sibi* Blkr. compared.

Bloch, Marc Elieser, and Schneider, Johann Gottlob.
1801. Systema ichthyologiae iconibus ex illustratum. Berolini, p. 21–22.
Thynnus sp.; short description; range.

Boisacq, Émile.
1913. Dictionnaire etymologique de la langue greque. Paris, p. 779.
Derivation of name pelamyde (young tuna).

Boletín de Pescas.
1917. Reglamento de almadrabas (continuación). Bol. Pescas, **2**, no. 9–10, p. 105–118.
Laws regulating almadraba fishery.

1922.1. La vida de la albacora (*Th. alalonga*) o bonito del Norte, en relación con la temperatura de las aguas. Bol. Pescas, **7**, no. 68–70, p. 222.
Relation of temperature to albacore.

1922.2. La pesca del atún en Tripoli. Bol. Pescas, **7**, no. 76, p. 429.

1924.1. Ciclos de aumento y disminunción del atún en Portugal. Bol. Pescas, **9**, no. 90–91, p. 87.
Periodical appearance of tuna in Portugal.

1924.2. Primeros resultados de la campaña internacional para el estudio del atún. Bol. Pescas, **9**, no. 92–93, p. 139–141.
Résumé of hydrographic conditions (temperature, salinity) affecting migrations.

1924.3. Reglamento para la pesca del atún con el arte de almadrabas. Bol. Pescas, **9**, no. 95–96, p. 215–230.
Laws regulating almadraba fishery of Spain.

1924.4. La pesca en Portgual. Proyecto de reglamento para la pesca del atún con artes fijos. Bol. Pescas, **9**, no. 97–98–99, p. 277–307.
Regulations protecting tuna fisheries in Portugal.

1925.1. Legislación sobre almadrabas. Bol. Pescas, **10**, no. 101, p. 16–18; no. 102, p. 61–63; no. 103, p. 92–95; no. 104, p. 141–144; no. 106, p. 209–211; no. 107, p. 250–251; no. 108–109, p. 305–307; no. 110, p. 330–334; no. 112, p. 393–397.
Legislation in regard to almadraba fishery in Spain.

1925.2. La pesca del atún en aguas atlánticas del sur de España. Bol. Pescas, **10**, no. 102, p. 60–61.
Fishery of Spain.

1925.3. Subasta de la almadraba Nuestra Señora de las Mercedes. Bol. Pescas, **10**, no. 102, p. 63–67.
Public sale of an almadraba fishery in Spain.

1925.4. La pesca del atún en Túnez (1924). Bol. Pescas, **10**, no. 105, p. 179–180.
Fishery in Tunis.

1925.5 Mala temporada en la pescas del atún. Bol. Pescas, **10**, no. 106, p. 225.
Fishery in Spain.

1925.6. Reglamento para el regimen de la pesca con el arte denominado de almadraba. Bol. Pescas, **10**, no. 111, p. 351–379.
Laws regulating almadraba fishery.

1926.1. Legislación sobre almadrabas. Bol. Pescas, **11**, no. 113, p. 8; no. 114, p. 50; no. 115, p. 80–81; no. 119, p. 194–196.
Legislation concerning almadraba fishery.

1926.2. El atún de Canarias. Bol. Pescas, **11**, no. 113, p. 12.
Fishery: note on total catch in the Canaries.

1926.3. El atún en los mares del Norte. El atún en los fjords noruegas. Bol. Pescas, **11**, no. 113, p. 17, 18.
Note on fisheries in Norway and North Sea.

1926.4. Subasta de la almadraba "Lances de Tarifa." Subasta de la almadraba "Rosita." Bol. Pescas, **11**, no. 117, p. 150–153.
Sale of two almadraba fisheries.

1926.5. El atún en Sicilia. Bol. Pescas, **11**, no. 117, p. 168–172.
Description of factory and industry in Sicily; illustrated.

1926.6 Almadrabas caladas en 1926 (Atlántico y lugares próximos). Almadraba "Calpe." Bol. Pescas, **11**, no. 118, p. 177–178.
Condition of fishery in Spain.

1926.7. La pesca del atún. Bol. Pescas, **11**, no. 118, p. 188–190.
Gig fishing described and illustrated.

Boletín de Pescas—Continued.

1926.8. La pesca del atún y del bonito en el Cantábrico. Bol. Pescas, 11, no. 123. p. 304–305.
The tuna and bonito fishery of Cantabrico.

1926.9. Almadrabas (Del primer negociado de la Dirección General de Pesca). Bol. Pescas, 11, no. 121, p. 236–238; no. 122, p. 262–263; no. 123, p. 298–300.
Legislation concerning almadraba.

1926.10. Almadrabas (Del primer negociado, sección segunda). Bol. Pescas, 11, no. 124, p. 238–240.
Statistics: returns from different almadraba fisheries in Spain.

1927.1. Asamblea de almadraberos y taraferos. Bol. Pescas, 12, no. 125, p. 17–18.
Meeting of almadraba fishermen, Spain.

1927.2. Almadrabas (Del primer negociado, sección segunda). Bol. Pescas, 12, no. 125, p. 19–21; no. 129, p. 148; no. 130, p. 162–163; no. 131, p. 204–205.
Legislation concerning almadraba.

1927.3. La pesca del atún en el Sahara occidental español. Fernando de Buen, sobre biología del atún, su pesca y conservación de sus carnes. Bol. Pescas, 12, no. 128, p. 99, 108–110.
Spawning off African coast; gear; migrations.

1927.4. La pesca de la sardina y del atún en aguas atlánticas del sur de España. Bol. Pescas, 12, no. 129, p. 148–151.
Fishery of Spain.

1927.5. Almadrabas (Sección II, Negociado I). Bol. Pescas, 12, no. 132, p. 241; no. 136, p. 360–361.
Regulations in regard to almadraba.

1928.1. Almadrabas (Sección 2, Negociado 1). Bol. Pescas, 13, no. 137, p. 13; no. 142, p. 189.
Regulations concerning almadraba.

1928.2. Escombridos de la región Balear. Bol. Pescas, 13, no. 138, p. 54–57.
Thunnus thynnus, statistics of catch.

1928.3. Dirección General de Pesca. Consorcio entre el estado y los almadraberos. Laboratorios costeros. Bol. Pescas, 13, no. 140, p. 117–125.
Legislation about partnership between state and almadraba fishery; catch observations of laboratory of Baleares.

1928.4. La pesca del atún en Túnez. Bol. Pescas, 13, no. 140, p. 128–129.
Fishery of Tunis.

1928.5. Consorcio alamadrabero. Bol. Pescas, 13, no. 143, p. 219.
Partnership of almadraba fishermen.

1928.6. Pesca de atún con almadrabas en Tripolitania. Bol. Pescas, 13, no. 146, p. 324.
Condition of fishery in Tripolitania.

Bollettino di Informazione Economiche del Ministero delle Colonie. Roma.

†1927.1. Le tonnare della Tripolitania. Boll. Inform. Econ. Min. Colonie, p. 14–18, 1 fig., 1 carte.
Tuna fishery in Tripolitania.

†1927.2. La pesca del tonno in Cirenaica. Boll. Inform. Econ. Min. Colonie, p. 25, 1 carte.

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Tuna iodine content.

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1925. La pêche du thon va commencer dans le golfe de Gascogne. Pêch. Marit., 8, no. 368, p. 369–370.
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1887. Poisonous fish. Bull. U. S. Fish. Comm. [for 1886] 6, p. 150.
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Italian method of tuna fishing.

Y

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†1883.1. La pesca e l'industria del tonno in Italia ed all'estero. Tipograf. A. Ciminago, Genova, 120 p.
Tuna fishery in Italy.

†1883.2. Ulteriori osservazioni sul regime daziario dei tonni, ecc. Tipograf. Ricci, Firenze, 80 p.
Observations pertaining to the tariff regulations on tuna in Italian fishery.

†1887. Riflessioni sul progettato aumento di dazio d' entrata del tonno sottolio, ecc. Palermo (Ristampa, Genova).
Plans for increasing the revenue tax on tuna oil, etc.

†1905. Raccolta di documenti e sentenze di tribunali comprovanti il danno che arrecano le acque torbide, ecc., nelle tonnare di Porto Paglia e P. Scuso opusc. Tipograf. cooper. Leonina, Roma, 72 p.
Collected documents and decisions of the court of justice proving the damage caused by the turbid water in the tuna pickling. (From title.)

LIST OF ABBREVIATIONS USED FOR PERIODICALS CITED

A

Aarsber. Selsk. Norske Fisk. Fremme.—Aarsberetning for Selskabet for de Norske Fiskeriers Fremme. Bergen.

Abh. Akad. Wiss.—Abhandlungen. Akademie der Wissenschaften zu Berlin.

Abh. K. Preussische Akad. Wiss.—Abhandlungen. K. Preussische Akademie der Wissenschaften. Berlin.

Act. Soc. Sci. Indo-Neerlandicae.—Acta Societatis Scientarium Indo-Neerlandicae. Batavia.

Allg. FischZeitg.—Allgemeine Fischereizeitung. München.

American Journ. Sci.—American Journal of Science. New Haven.

An. Soc. Española Hist. Nat.—Anales de la Sociedad Española de Historia Natural. Madrid.

Ann. Agric. Min. Agric. Ind. Comm.—Annali di Agricoltura. Ministero di Agricoltura, Industria e Commercio. Roma.

Ann. Hydrogr. Paris.—Annales Hydrographiques. Paris.

Ann. Inst. Océanogr. Monaco.—Annales de l'Institut Océanographique de Monaco. Monaco.

Ann. Mag. Nat. Hist.—Annals and Magazine of Natural History. London.

Ann. Micr. Paris.—Annales de Micrographie. Paris.

Ann. Mus. Hist. Nat. Marseille.—Annales du Musée d'Histoire Naturelle de Marseille. Marseille.

Ann. New York Acad. Sci.—Annals of the New York Academy of Sciences. New York.

Ann. Rept. Comm. Inland Fish. Rhode Island.—Annual Report of the Commissioners of Inland Fisheries of the State of Rhode Island. Providence.

Ann. Rept. Fish. Board Scotland.—Annual Report of the Fishery Board for Scotland. Edinburgh.

Ann. Rept. Laguna Mar. Lab.—Annual Report of the Laguna Marine Laboratory. Claremont, California.

Ann. Rept. New Jersey Mus.—Annual Report of the New Jersey State Museum. Trenton.

Ann. Rept. New York Mus.—Annual Report of the New York State Museum of Natural History. Albany.

Ann. Sci. Géol.—Annales des Sciences Géologiques, ou Archives de Géologie, de Minéralogie, de Paléontologie . . . Paris.

Ann. Sci. Nat. Paris.—Annales des Sciences Naturelles. (a) Botanique. (b) Zoologie. Paris.

Ann. Sci. Nat. Porto.—Annaes des Sciencias Naturaes. Porto.

Ann. Scottish Nat. Hist.—Annals of Scottish Natural History. Edinburgh. *Cont'd* as Scottish Naturalist.

Ann. South African Mus.—Annals of the South African Museum. Cape Town.

Ann. Sta. Océanogr. Salammbô.—Annales. Station Océanographique de Salammbô. Tunis.

Annu. Mus. Zool. Univ. Napoli.—Annuario R. Museo Zoologico della R. Università di Napoli. Napoli.

Anu. Com. Perm. Pesca.—Anuario de la Comisión Permanent de Pesca. Madrid.

Anu. Estadís. Pesca.—Anuario Estadístico de la Marina Mercante y de la Pesca Marítima. Madrid.

Aquatic Life. Philadelphia.

Arb. Zool. Inst. Wien.—Arbeiten aus dem Zoologischen Institut der Universität Wien, und der Zoologischen Station in Triest. Wien.

Arch. Farmacol. Speriment.—Archivio di Farmacologia Sperimentale e Scienze Affini. Roma.

Arch. Italiennes Biol.—Archives Italiennes de Biologie. Pise.

Arch. Parasit.—Archives de Parasitologie. Paris.

Arch. Sci. Phys. Nat.—Archives des Sciences Physiques et Naturelles. Genève, Lausanne, Paris.

Årsber. Vedkom. Norges Fisk.—Årsberetning Vedkommende Norges Fiskerier. Bergen.

Atco Fish. News.—Atco Fisheries News. New York.

Atti Accad. Gioenia Sci. Nat.—Atti della R. Accademia Gioenia di Scienze Naturali. Catania.

Atti Accad. Sci. Torino.—Atti R. Accademia delle Scienze di Torino. Turin.

Atti Cong. Assoc. Med. Italiana—Atti del Congresso. Associazione Medica Italiana.

Atti Min. Agric. Ind. Comm.—Atti Ministero di Agricoltura, Industrie e Commercio. Roma.

Atti Soc. Ligustica Sci. Nat. Geogr.—Atti della Società Ligustica di Scienze Naturali e Geografiche. Genova.

B

Bergens Mus. Aarb.—Bergens Museums Aarbok. Bergen.

Ber. Komm. Untersuch. Kiel.—Bericht der Kommission zur Untersuchung der Deutschen Meere in Kiel. Berlin.

Bienn. Rept. California Fish Game Comm.—Biennial Report. California Fish and Game Commission. Sacramento.

Bol. Pescas.—Boletín de Pescas. Instituto Español de Oceanografía. Madrid.

Bol. Rev. Geogr. Col. Merc. Madrid.—Boletín. Revista de Geografica Colonial y Mercantil. Sociedad Geografica. Madrid.

Boll. Bimest. Talasso. Italiano.—Bollettino Bimestrale R. Comitato Talassografico Italiano. Venezia. *Formerly* Bollettino del Comitato Talassografico. Roma.

Boll. Consoli.—Bollettino del Consoli. Roma.

Boll. Inform. Econ. Min. Colonie.—Bollettino di Informazioni Economiche del Ministero delle Colonie. Roma.

Boll. Min. Agric. Ind. Comm.—Bollettino Ufficiale del Ministero d'Agricoltura, Industria e Commercia. Roma.

Boll. Mus. Zool. Anat. Comp. Torino.—Bollettino dei Musei di Zoologia e di Anatomia Comparata della R. Università. Torino.

Boll. Notiz. Agrarie.—Bollettino di Notizie Agrarie. Roma.

Boll. Pesca Piscicolt. Idrobiol.—Bollettino di Pesca, Piscicoltura e di Idrobiologia. Ministerio dell'Economia Nazionale. Roma.

Boll. Sci. Mediche.—Bollettino delle Scienze Mediche. Bologna.

Boll. Soc. Geogr. Italiana.—Bollettino della Società Geografica Italiana. Roma.

Boll. Soc. Lombardo Pesca Aquicolt.—Bollettino. Società Lombardo per la Pesca e l'Aquicoltura. *Formerly* Rivista Mensile di Pesca. Pavia.

Boll. Soc. Med. Prov. Bergamo.—Bollettino. Società Medica Provinciale di Bergamo. Bergamo.

Boll. Soc. Zool. Italiana.—Bollettino della Società Zoologica Italiana. Roma.

Boll. Talasso. Italiano.—Bollettino del Comitato Talassografico. Roma. *Cont'd as* Bollettino Bimestrale R. Comitato Talassografico Italiano. Venezia.

Bull. American Mus.—Bulletin of the American Museum of Natural History. New York.

Bull. Biol. France Belgique.—Bulletin Biologique de la France et de la Belgique. Paris. *Formerly* Bulletin Scientifique de la France et de la Belgique. Londres, Paris, Berlin.

Bull. Bishop Mus.—Bulletin. Bernice P. Bishop Museum. Honolulu.

Bull. Comm. Explor. Méditerranée.—Bulletin. Commission internationale pour l'Exploration Scientifique de la Mer Méditerranée. Monaco.

Bull. Inst. Océanogr. Monaco.—Bulletin de l'Institut Océanographique de Monaco. Monaco. *Formerly* Bulletin du Musée Océanographique de Monaco.

Bull. Méd. Vosges.—Bulletin Médical des Vosges. Rambervillers.

Bull. Mus. Hist. Nat. Paris.—Bulletin du Muséum d'Histoire Naturelle. Paris.

Bull. New York Mus.—Bulletin of the New York State Museum of Natural History. Albany.

Bull. New York Zool. Soc.—Bulletin of the New York Zoological Society. New York.

Bull. Sci. France Belgique.—Bulletin Scientifique de la France et de la Belgique. Londres, Paris, Berlin. *Cont'd as* Bulletin Biologique de la France et de la Belgique. Paris.

Bull. [*sic*] Sci. Mediche.—Bullettino delle Scienze Mediche. Bologna.

Bull. Scripps Instn.—Bulletin. Scripps Institution for Biological Research. University of California. Berkeley.

Bull. So. California Acad. Sci.—Bulletin of the Southern California Academy of Sciences. Los Angeles.

Bull. Soc. Acclim. France.—Bulletin de la Société Nationale d'Acclimatation de France. Paris.

Bull. Soc. Belge Géol. Paléont. Hydrol.—Bulletin de la Société Belge de Géologie, de Paléontologie et d'Hydrologie. Bruxelles.

Bull. Soc. Centr. Aquicult. Pêch.—Bulletin de la Société Centrale d'Aquiculture et de Pêche. Paris.

Bull. Soc. Hist. Nat. Afrique Nord.—Bulletin de la Société d'Histoire Naturelle de l'Afrique du Nord. Alger.

Bull. Soc. Nat. Moscou.—Bulletin de la Société des Naturalistes de Moscou. Moscou.

Bull. Soc. Océanogr.—Bulletin de la Société d'Océanographique de France. Paris.

Bull. Soc. Portugaise Sci. Nat.—Bulletin de la Société Portugaise des Sciences Naturelles. Lisbonne.

Bull. Soc. Sci. Hist. Nat. Corse.—Bulletin de la Société des Sciences Historiques et Naturelles de la Corse. Bastia.

Bull. Soc. Sci. Nat. Maroc.—Bulletin de la Société des Sciences Naturelles de Maroc. Maroc.

Bull. Soc. Zool. France.—Bulletin de la Société Zoologique de France. Paris.

Bull. Sta. Aquic. Pêch. Castiglione.—Bulletin des Travaux. Station d'Aquiculture et de Pêche de Castiglione. Alger.

Bull. Sta. Océanogr. Salammbô. Bulletin. Station Océanographique de Salammbô. Tunis.

Bull. Trim. Pêch. Marit.—Bulletin Trimestriel de l'Enseignement Professionel et Technique des Pêches Maritimes. Orléans, Paris.

Bull. U. S. Bur. Fish.—Bulletin of the [United States] Bureau of Fisheries. Washington. *Formerly* Bulletin of the United States Fish Commission. Washington.

Bull. U. S. Fish Comm.—Bulletin of the United States Fish Commission. Washington. *Cont'd as* Bulletin of the [United States] Bureau of Fisheries.

C

C. R. Acad. Sci. Paris.—Compte Rendu Hebdomadaire des Séances de l'Académie des Sciences. Paris.

C. R. Assoc. Française Avanc. Sci.—Compte Rendu de l'Association Française pour l'Avancement des Sciences. Paris.

C. R. Cong. Soc. Sav., Paris, Dijon.—Compte Rendu. Congrès des Sociétés Savantes de Paris, tenu à Dijon.

C. R. Soc. Biol. Paris.—Compte Rendu Hebdomadaire des Séances et Mémoires de la Société de Biologie. Paris.

California Fish.—California Fisheries. San Pedro, California. *Cont'd as* West Coast Fisheries.

California Fish Game.—California Fish and Game. Sacramento.

Canadian Fish.—Canadian Fisherman. Gardenvale.

Commun. Acad. Mar. Paris.—Communications et Mémoires. Académie de Marine. Paris.

Cong. Intern. Pêch. Marit.—Congrès International des Pêches Maritimes, d'Ostréiculture, et d'Aquiculture Marine. Dieppe; *and* Paris.

Cong. Nat. Pêch. Marit.—Congrès National des Pêches Maritimes tenu à Tunis; Orleans; *and* Sables d'Olonne. Paris.

Contrib. Biol. Hopkins Lab.—Contributions to Biology from the Hopkins Seaside Laboratory of the Leland Stanford Jr. University. Palo Alto.

Copeia. New York.

Cosmos. Revue des Sciences et leurs Applications. Paris.

D

Dir. Gen. Mar. Mer.—Direzione Generale della Marina Mercantile. Roma.

E

Edinburgh Philos. Journ.—Edinburgh New Philosophical Journal. Edinburgh.

F

Fauna och Flora. Upsala.
Fischerbote.—Der Fischerbote. Hamburg.
Fischwirtschaft.—Die Fischwirtschaft. Wesermünde.
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Jordan and Evermann, 1926.1.
Snyder, 1904.
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Bleeker, 1879.
Jordan and Hubbs, 1925.
Kitahara, 1897.
Richardson, 1845.
Temminck and Schlegel, 1850.
Pacific, Central
Fowler, 1927.
Statistics, Japan
Nakamoura and Ourakami, 1900.
Synonymy
Günther, 1860.
Richardson, 1845.

PELAMYS MACROPTERUS. See *Neothunnus macropterus.*

PELAMYS PELAMYS. See *Euthynnus pelamis.*

PELAMYS SARDA. See *Sarda sarda.*

PELAMYS SIBI. See *Parathunnus sibi.*

PELAMYS THUNNINUS. See *Euthynnus alletteratus.*

PELAMYS THYNNUS. See *Thunnus thynnus.*

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Bachieri, 1907.
Bassett-Smith, 1903.
Galiay, 1845.
Henderson, 1830.
Lardier, 1891.
Lussana, 1894.
Marcacci, 1891, 1893.
Monti, N., 1910.
Pagnoni, 1894.
Pergola, 1912.
Pergola and Collodi, 1910.
Tenison-Woods, 1882.
Teyxeira, 1910.
Tybring, 1887.
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Mattioli, 1704.

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Aldrovandi, 1613.
Bellón Uriarte, 1926.2.
Buen, F., 1922, 1928.
Calapaj, 1927.
Cuvier and Valenciennes, 1831.

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Devedjian, 1926.
Dollfus, 1927.
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Gruvel, 1926.1.
Keller, 1913.
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Leca, 1911.
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Parona, 1919.
Rhode, 1890.
Simmonds, 1879.
Smidth, 1876.
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Germo germo
Clark, 1929.
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Heldt, 1927.2, 1928.1, 1928.2, 1929.
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Apicius, 1542.
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Barnhart, 1927.
Bol. Pescas, 1927.3.
Buen, F., 1924, 1925, 1927.1, 1927.2.
Buen, O., 1924.2.
Bullen, 1904.
Canadian Fish., 1922.
Carlier y Vivora, 1908.
Cuvier and Valenciennes, 1831.
Day, 1880.
Ehrenbaum, 1924.
Floericke, 1923.
Fries, Ekstrom and Sundevall, 1893.
Goode, 1884.
Gruvel and Conseil, 1925.
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Hovasse, 1927.
Ninni, E., 1921.2.
Oppianus, 1928.
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Rhode, 1890.
Roule, 1913.1, 1914.2, 1917.1, 1929.
Sanzo, 1910.1, 1910.2, 1925, 1929.
Scofield, N. B., 1914.
Sella, 1929.
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Canned as tuna
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Chemical analysis
Dill, 1921.1.
Common names
Craig, 1929.
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Ulrey and Greeley, 1928.
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Craig, 1929.
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SARDA PELAMITUS. See *Sarda sarda.*

SARDA SARDA
Anatomy
Lacépède, 1829.
Common names
Parona, 1919.
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Breder, 1929.
Caraffa, 1902.
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Lacépède, 1829.
Parona, 1919.
Risso, 1826.
Distribution
Breder, 1929.
Jenkins, 1925.
Parona, 1919.
Tracy, 1907.
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Breder, 1929.
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Habits
Tracy, 1907.
Keys
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Larvae described and figured
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SARDA SARDA—Continued.
Migrations
Jenkins, 1925.
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Recorded from
British Waters
Jenkins, 1925.
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Rafinesque-Schmaltz, 1810.1.
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United States, east coast
Goode, 1879.
Synonymy
Parona, 1919.

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Breder, 1929.
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Breder, 1929.
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Breder, 1929.
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France
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Le Danois, 1928.
Pêch. Marit., 1923.2.
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Italy
Mitt. Deutsch. SeefischVer., 1927.
Norsk FiskTid., 1927.2.
Parona, 1912.
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Sella, 1912.2, 1926.1, 1926.2, 1927.
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Carlos de Bragança, 1899.
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Atlantic Coast
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Scofield, N. B., 1918, 1922.1.
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Nomenclature
Jordan, 1888.

SCOMBER ALALONGA. See *Germo alalunga.*

SCOMBER ALBACORES. See *Neothunnus albacores.*

SCOMBER ALLETTERATUS. See *Euthynnus alletteratus.*

SCOMBER BISUS
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SCOMBER BRACHYPTERUS. See *Thunnus brachypterus.*

SCOMBER COLIAS

Recorded from Sicily
Rafinesque-Schmaltz, 1810.1.

SCOMBER GERMO. See *Germo alalunga.*

SCOMBER LAROCHE

Description
Risso, 1810.

Recorded from Mediterranean
Risso, 1810.

SCOMBER PELAMIS. See *Euthynnus pelamis*

SCOMBER PELAMYS. See *Euthynnus pelamis.*

SCOMBER SARDA. See *Sarda sarda.*

SCOMBER THUNINA. See *Euthynnus alletteratus.*

SCOMBER THYNNUS. See *Thunnus thynnus.*

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SPAWNING. See Reproduction.

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Marchesetti, 1882.

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California Div. Fish Game, 1919.2, 1927, 1928.
Conner, 1929, 1930.
Croker, 1929.
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Sette, 1925, 1926, 1927.
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Tressler, 1923.
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Lemy, 1901.
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Roule, 1914.3.

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Parona, 1919.
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Somigli, 1912.

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Aubertin, 1909.1, 1909.2.

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Marchand, 1926.

Norway
Hanson, 1927.

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Leach, 1928.
Minist. Mar. Lisboa, 1925, 1926, 1927.1, 1927.2, 1927.3.
Neuparth, 1925.

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Bellón Uriarte, 1926.2.
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Buen, O., 1923.
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Delgado, 1921.
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Bourge, 1914.
Durando, 1887.
Fages and Ponzevera, 1908.
Monconduit, 1927.
Roule, 1924.2.

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Atún or tuna
Bol. Pescas, 1924.2.
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THON. See also *Thunnus thynnus.*

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Growth
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Anatomy
Bridge, 1904.
Kölliker, 1859.
Lütken, 1880.
Regan, 1909.

Classification
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Regan, 1909.
Swainson, 1839.

Common names
Salviano, 1554.

Description
Artedi, 1738.
Belon, 1553.
Bloch and Schneider, 1801.
Cuvier, 1884.
Dumeril, 1856.
Linnaeus, 1764.
Salviano, 1554.
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Distribution
Bloch and Schneider, 1801.
Cuvier, 1884.
Salviano, 1554.

THUNNUS—Continued.

Fossils from
Croatia, Tertiary
Kramberger-Gorjanovic, 1882.
Italy, Tertiary
Bosniaski, 1879.
Rivère, 1886.
Sardinia, Miocene
Bassani, 1891.

Growth
Lütken, 1880.

Habitat
Linnaeus, 1758.

Habits
Salviano, 1554.

Keys
Dumeril, 1856.

Nomenclature
Gill, 1894.
Jordan, 1888, 1923.1.

Parasites
Moulé, 1908.

Recorded from
Japan
Jordan, 1901.
Java
Bleeker, 1844.
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Scofield, 1929.2.

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Spelling of name
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Synonymy
Dresslar and Fesler, 1889.
Linnaeus, 1758, 1764.

Temperature
Davy, 1835.

THUNNUS AFFINIS. See *Euthynnus alletteratus.*

THUNNUS ALALUNGA. See *Germo alalunga.*

THUNNUS ALBACORA. See *Germo alalunga.*

THUNNUS ALBUI

Fossils from Oligocene of Rumania
Simionescu, 1906.

THUNNUS ALLISONI. See *Neothunnus allisoni.*

THUNNUS ANGUSTUS

Anatomy
Storms, 1889.

Fossils from upper Miocene of Sicily
Woodward, 1901.

THUNNUS ARGENTIVITTATUS. See *Neothunnus argentivittatus.*

THUNNUS ATLANTICUS. See *Germo alalunga.*

THUNNUS AUGUSTUS

Fossils from upper Miocene of Sicily
Sauvage, 1873.

THUNNUS BALTEATUS. See *Germo alalunga.*

THUNNUS BELLONI
Synonymy
Artedi, 1738.

THUNNUS BILINEATUS
Coloration
Klunzinger, 1871.
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Description
Günther, 1860.
Klunzinger, 1871.
Rüppel, 1835.
Distribution
Günther, 1860.
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Rüppel, 1835.
Food
Klunzinger, 1871.
Synonymy
Günther, 1860.

THUNNUS BOLCENSIS
Description
Agassiz, 1833.
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Fossils from
Italy, early Tertiary
Agassiz, 1833.
Pictet, 1854.
Italy, upper Eocene of Monte Bolca
Eastman, 1911.
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Synonymy
Eastman, 1911.

THUNNUS BRACHYPTERUS. See also *Thunnus thynnus.*
Classification
Ninni, E., 1921.1.
Common names
Moreau, 1881, 1892.
Parona, 1919.
Description
Canestrini, 1870.
Couch, 1862.
Cuvier, 1829, 1884.
Guichenot, 1850.
Günther, 1860.
La Blanchère, 1868.
Moreau, 1881, 1892.
Ninni, A. P., 1882.
Ninni, E., 1921.1.
Parona, 1919.
South, 1845.
Distribution
Cuvier, 1829, 1884.
Guichenot, 1850.
Günther, 1860.
Moreau, 1881.
South, 1845.
Figured
Couch, 1862.
Parona, 1919.
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La Blanchère, 1868.

THUNNUS BRACHYPTERUS—Cont.
Keys
Moreau, 1892.
Migrations
Cuvier, 1829.
Pavesi, 1887.
Recorded from
Adriatic
Ninni, A. P., 1882.
Algeria
Bounhiol, 1911.2.
Guichenot, 1850.
British Isles
Couch, 1862.
Cornish, 1868, 1880.
Portugal
Seabra, 1911.
Synonymy
Couch, 1862.
Guichenot, 1850.
Günther, 1860.
La Blanchère, 1868.
Moreau, 1881.
Parona, 1919.
Young described
Sanzo, 1910.1.

THUNNUS BRASILIENSIS. See *Euthynnus alletteratus.*

THUNNUS BREVIPINNIS. See *Euthynnus alletteratus.*

THUNNUS CORETTA
Description
Günther, 1860.
Jordan and Evermann, 1926.2.
South, 1845.
Distribution
Günther, 1860.
Jordan and Evermann, 1926.2.
South, 1845.
Keys
Jordan and Evermann, 1926.2.
Migrations
Pavesi, 1887.
Recorded from Mediterranean
Cuvier and Valenciennes, 1831.
Synonymy
Günther, 1860.

THUNNUS GERMO. See *Germo alalunga.*

THUNNUS LANCEOLATUS
Anatomy
Storms, 1889.
Description
Agassiz, 1833.
Pictet, 1854.
Fossils from
Italy, early Tertiary
Agassiz, 1833.
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Italy, upper Eocene of Monte Bolca
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Sauvage, 1873.
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Synonymy
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THUNNUS LATIOR

Anatomy
Storms, 1889.

Description
Agassiz, 1833.
Pictet, 1854.

Fossils from

Italy, early Tertiary
Pictet, 1854.

Italy, upper Eocene of Monte Bolca
Agassiz, 1833.
Eastman, 1911.
Sauvage, 1873.
Woodward, 1901.

Synonymy
Eastman, 1911.

THUNNUS LEACHIANUS. See *Euthynnus alletteratus.*

THUNNUS LISSA

Description
Willughby, 1686.

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Willughby, 1686.

Migrations
Willughby, 1686.

THUNNUS MACCOYI

Color
Roughly, 1916.

Description
Jordan and Evermann, 1926.2.
Macleay, 1881.
Roughly, 1916.

Distribution
Jordan and Evermann, 1926.2.
Macleay, 1881.

Habits
Roughly, 1916.

Keys
Jordan and Evermann, 1926.2.

Recorded from Australia
McCulloch, 1922.
Roughly, 1916.

THUNNUS MACROPTE

Canning in Japan
Nakamoura and Ourakami, 1900.

Statistics, Japan
Nakamoura and Ourakami, 1900.

THUNNUS MACROPTERUS. See *Neothunnus macropterus.*

THUNNUS MACULATUS

Distribution
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Figured
Holder, 1912.

Recorded from North America, west coast
Holder, 1912.

THUNNUS MEDITERRANEUS. See *Thunnus thynnus.*

THUNNUS OBESUS. See *Parathunnus obesus.*

THUNNUS ORCYNUS

Synonymy
Artedi, 1738.

THUNNUS ORIENTALIS

Anatomy
Kishinouye, 1923.

Classification
Kishinouye, 1923.

Common names, Japanese
Kishinouye, 1923.

Description
Günther, 1860.
Jordan and Evermann, 1926.2.
Jordan and Hubbs, 1925.
Jordan and Jordan, 1922.
Kishinouye, 1923.
Temminck and Schlegel, 1850.

Distribution
Günther, 1860.
Jordan and Evermann, 1926.2.
Temminck and Schlegel, 1850.

Figured
Otaki, Fujita and Higurashi, 1903.

Habitat
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Keys
Kishinouye, 1923.

Recorded from

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Jordan and Evermann, 1926.1.
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Japan
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Otaki, Fujita and Higurashi, 1903.
Richardson, 1845.
Temminck and Schlegel, 1850.

Korea
Mori, 1928.

Synonymy
Günther, 1860.
Kishinouye, 1923.
Richardson, 1845.

THUNNUS PACIFICUS. See *Germo alalunga.*

THUNNUS PELAMYS. See *Euthynnus pelamis.*

THUNNUS PEREGRINUS

Classification
Collett, 1880.2.

Description
Collett, 1880.1.

Distribution
Collett, 1880.1.

Recorded from Norway
Collett, 1880.1.

Synonymy
Collett, 1880.2.

THUNNUS PHILLIPSI

Description
Jordan and Evermann, 1926.2.

Distribution
Jordan and Evermann, 1926.2.

THUNNUS PHILLIPSI—Continued.
Figured
Jordan and Evermann, 1926.2.
Keys
Jordan and Evermann, 1926.2.

THUNNUS PROPTERYGIUS
Anatomy (fossil)
Storms, 1889.
Description
Agassiz, 1833.
Pictet, 1854.
Fossils from early Tertiary of Italy
Agassiz, 1833.
Pictet, 1854.
Sauvage, 1873.

THUNNUS PROXIMUS
Anatomy
Storms, 1889.
Fossils from upper Miocene of Sicily
Woodward, 1901.

THUNNUS QUADRIPUNCTATUS
Recorded from Portugal
Seabra, 1911.

THUNNUS SALIENS
Common names
Craig, 1929.
Description
Jordan and Evermann, 1926.2.
Distribution
Jordan and Evermann, 1926.2.
Figured
Jordan and Evermann, 1926.2.
Keys
Jordan and Evermann, 1926.2.

THUNNUS SARDUS. See *Sarda sarda.*

THUNNUS SCALDISIENSIS
Fossils from Coralline Crag, England
Woodward, 1890.

THUNNUS SCALDISII
Anatomy (fossil)
Storms, 1889.
Fossils from lower Pliocene, England
Woodward, 1901.

THUNNUS SCHLEGELI. See *Thunnus orientalis.*

THUNNUS SECUNDODORSALIS
Color
Storer, 1853.
Compared with Thunnus vulgaris
Storer, 1853.
Description
Breder, 1929.
Jordan and Evermann, 1926.2.
Poey y Aloy, 1875.
Storer, 1853.
Distribution
Breder, 1929.
Jordan and Evermann, 1926.2.
Storer, 1853.

THUNNUS SECUNDODORSALIS—Cont.
Habitat
Poey y Aloy, 1875.
Keys
Breder, 1929.
Jordan and Evermann, 1926.2.
Recorded from
Cuba
Poey y Aloy, 1875.
Massachusetts
Storer, 1853.
United States, east coast
Baird, 1873.
Gill, 1873.
Used for oil
Storer, 1853.

THUNNUS SIBI. See *Parathunnus sibi.*

THUNNUS SUBULATUS
Description
Jordan and Evermann, 1926.2.
Poey y Aloy, 1875.
Distribution
Jordan and Evermann, 1926.2.
Habitat
Poey y Aloy, 1875.
Keys
Jordan and Evermann, 1926.2.
Recorded from
Cuba
Poey y Aloy, 1875.
West Indies
Jordan, 1887.

THUNNUS THUNNINA. See *Euthynnus alletteratus.*

THUNNUS THYNNUS. See also *Thunnus brachypterus,* Thon, Tuna.
Age
Parona, 1919.
Anatomy
Boulenger, 1910.
Collett, 1902.
Cuvier and Valenciennes, 1831.
Davy, 1835.
Eschricht and Müller, 1835.
Faravelli, 1890.
Frade, 1925.
Goodrich, 1900.
Heldt, 1927.1, 1927.3, 1928.1, 1928.2.
Jordan, 1892.
Jurine, 1821.
Kyle, 1926.
Lilljeborg, 1891.
McIntosh, 1886.1, 1886.2.
Masterman, 1894.
Schulze, 1903.
Shufeldt, 1885, 1901, 1922.
Starks, 1910.
Storms, 1889.
Ancient references
Hoffman and Jordan, 1892.
Keller, 1913.
Rhode, 1890.
Canning
Cobb, 1919.1.
Dollfus, 1927.
Elliott, 1922, 1923, 1924.

THUNNUS THYNNUS—Continued.
Canning—Continued.
Heldt, 1928.1, 1928.2.
Pacific Fish. Stat. No. 1927.1, 1928.1.
Serv. Reg. Announc., 1920.
Chemical analysis
Dill, 1921.1, 1921.2.
Suzuki and Otsuki, 1912.
Classification
Fries, Ekstrom and Sundevall, 1893.
Heldt, 1926, 1927.1, 1927.3.
Jordan and Evermann, 1896.1.
Ninni, E., 1921.1.
Starks, 1910.
Swainson, 1839.
Color
Bigelow, 1925.
Buen, F., 1925.
Nichols, 1922.
Roughly, 1916.
Roule, 1922.
Turton, 1807.
Commensals
Beneden, 1871.
Parona, 1919.
Commercial importance
Bigelow, 1925.
Miranda y Rivera, 1927.
Shufeldt, 1922.
Common names
Buen, F., 1922.
Carus, 1893.
Day, 1880.
Faber, 1883.
Heldt, 1926.
Jordan and Evermann, 1896.2.
Joubin and Le Danois, 1924.
Lacépède, 1829.
Le Danois, 1921.1.
Moreau, 1881, 1892.
Parona, 1898, 1919.
Salviano, 1554.
Sella, 1912.1.
Compared with *Thunnus secundodorsalis*
Storer, 1853.
Considered poisonous in Antilles
Tybring, 1887.
Description
Aldrovandi, 1613.
Atco Fish. News, 1926.
Barnard, 1927.
Baskett, 1899.
Bean, 1903.
Bigelow, 1925.
Bonnaterre, 1788.
Boulenger, 1910.
Brunchorst, 1898.
Brünnich, 1768.
Buckland, 1881.
Buen, F., 1925.
Canestrini, 1870.
Caraffa, 1902.
Carus, 1893.
Century Dictionary, 1906.
Collett, 1880.1.
Corson, 1923.1.
Couch, 1862.
Cunningham, 1893.
Cuvier, 1829, 1884.

THUNNUS THYNNUS—Continued.
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Cuvier and Valenciennes, 1831.
Day, 1886.
DeKay, 1842.
Devedjian, 1926.
Elliott, 1922, 1923, 1924.
Encyclopaedia Britannica, 1926.
Fitzinger, 1864, 1867.
Fleming, 1828.
Fowler, 1906.
Fries, Ekstrom and Sundevall, 1893.
Giovio, 1524.
Guichenot, 1850.
Günther, 1860, 1876, 1880.
Hamilton, 1843.
Heldt, 1926, 1927.1, 1927.3, 1928.2.
Hildebrand and Schroeder, 1928.
Jenkins, 1925.
Jordan, 1925.2, 1929.
Jordan and Evermann, 1896.1, 1902, 1914, 1926.2.
Jordan and Gilbert, 1883.
Jordan and Jordan, 1922.
Joubin and Le Danois, 1924.
La Blanchère, 1868.
Lacépède, 1829.
Lankester, 1908.
Le Danois, 1921.1.
Le Gall, 1927.2.
Lilljeborg, 1891.
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FISH BULLETINS

* No. 1. Report on Fish Conditions. 1913; 48 pp., 3 figs. Contains:
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The Towing of Salmon and Steelhead Fry from Sacramento to the Sea in a "Live Car." By N. B. Scofield.
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A General Report on a Quinnat Salmon Investigation Carried on During the Spring and Summer of 1911. By N. B. Scofield.
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No. 4. The Edible Clams, Mussels and Scallops of California. By Frank W. Weymouth. Jan. 10, 1921; 74 pp., 19 pls., 26 figs.

* No. 5. A Key to the Families of Marine Fishes of the West Coast. By Edwin C. Starks. March 3, 1921; 16 pp., 4 figs.

* No. 6. A History of California Shore Whaling. By Edwin C. Starks. October 1922; 38 pp., 22 figs.

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- I. Thompson, Will F. The California Sardine and the Study of the Available Supply.
- II. Sette, Oscar Elton. Sampling the California Sardine: A Study of the Adequacy of Various Systems at Monterey.
- III. Higgins, Elmer H. A Study of Fluctuations in the Sardine Fishery at San Pedro.
- IV. Thompson, Will F. Errors in the Method of Sampling Used in the Study of the California Sardine.
- V. Scofield, W. L. The Sardine at Monterey: Dominant Size Classes and their Progression, 1919-1923.

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No. 22. A Bibliography of the Tunas. By Genevieve Corwin. 1930; 103 pp.

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